Registration Number:

Date:

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU -27
M.Sc. (organic chemistry) – III SEMESTER
SEMESTER EXAMINATION: OCTOBER 2022
(Examination conducted in December 2022)

OCH 9222: RETROSYNTHESIS AND MODERN ASPECTS OF ORGANIC CHEMISTRY

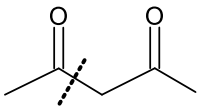
Time: 2 ½ Hours **Max Marks: 70**

This paper contains FOUR printed pages and THREE parts

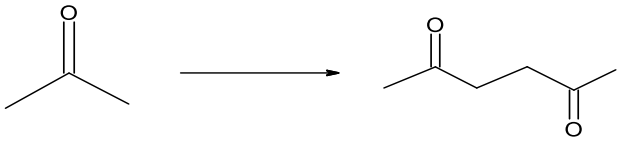
PART-A

Answer any **SIX** questions **6X2=12M**

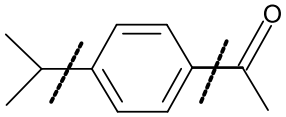
1. Provide synthons for the disconnection shown.



2. Demonstrate the following synthesis using epoxide as an umpolung synthon.



3. What does FGI mean in retrosynthesis? Suggest a FGI to change the directional property of nitro group in aromatic electrophilic substitution.
4. Which of the disconnections is better to prepare the following compound? Justify.



(a) (b)

5. Demonstrate one group C-X disconnection with a suitable example.
6. Give an example of a reaction to show the use of α-halo carbonyl compounds in synthesis.
7. Multiple alkylation is a problem encountered in the synthesis of amines. Suggest any two solutions to this problem.
8. Give the structure of aza-*o*-quinone methide. Is it an inverse electron demand diene or a normal electron demand diene?

PART-B

Answer any **FOUR** questions which must compulsorily contain **Q 9 or Q 10**

4x12=48M

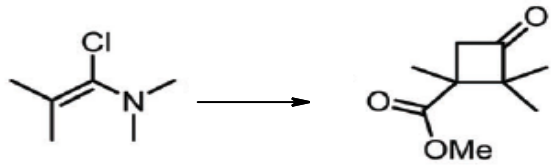
9. (a) What is the use of $(EtO)_3BF_4$ in organic synthesis involving amide activation? Give the full form of TBDPS protecting group and its advantage.

   (b) How is a 2° amide converted into an ester using a transition metal catalyst?

   (c) Give Wang's indole synthesis using EDA.

   (d) Write the mechanism of the following conversion via amino cyclopropane intermediate.

   (3+3+3+3)



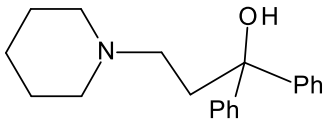
chloro enamine

10. (a) Give any three methods to generate aza-*o*-QM.

    (b) How do you construct benzobicyclo[2,2,2]octane skeleton using intermolecular Diels-Alder reaction?

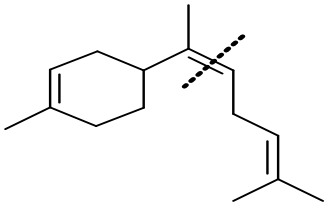
    (c) Give the full form and application of NHC and BINOL **(4+4+4)**

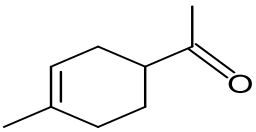
11. (a) Analyse the following molecule and suggest a synthesis using bromobenzene.



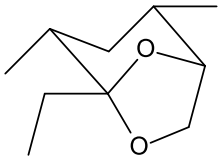
(b) Draw the structure of ferruginol, a monoterpene from sequoia tree. How would you convey the meaning of 'convergent' and 'linear' synthesis with respect to the structure of this molecule? Give Friedel-Crafts disconnection of ferruginol.

(c) Complete the following disconnections in the analyses of bisabolene and write the equivalents. **(6+3+3)**

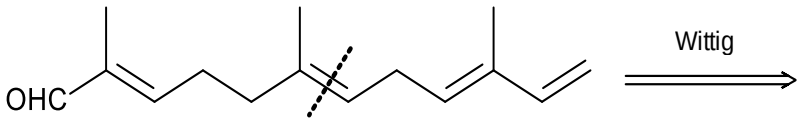
i) 

ii) 

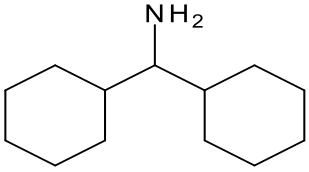
12. (a) Write convergent synthesis of multistriatin (structure given below).



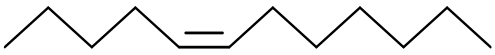
(b) Carry out the initial disconnection of α-sinensal as shown below and write the two synthons. Write the analysis of any one of the synthons obtained. **(6+6)**



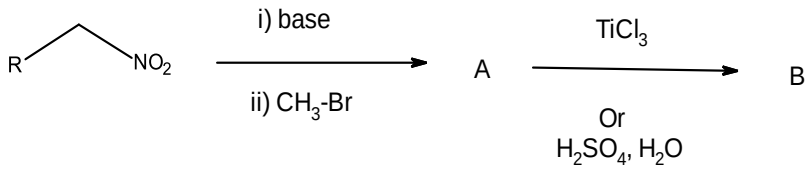
13. (a) Suggest a method of preparation of the following 1° amine based on disconnection.



(b) Demonstrate the use of acetylene in the synthesis of the following Z-alkene.

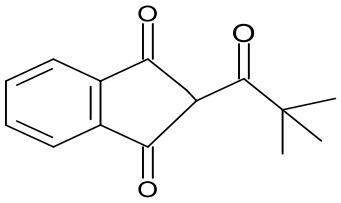


(c) What are the advantages of α-nitro compounds over enolisable carbonyl compounds? Identify A and B in the following reaction. **(6+3+3)**



14. (a) Show how the following functional groups are protected and give the condition for corresponding deprotection. (i) Alcohols as THP (ii) Amines as t-BOC.

(b) Name the type of disconnection and analyse the compound below. Write the synthesis.

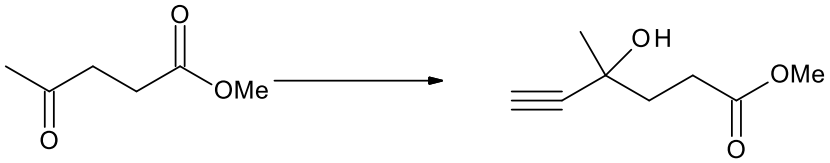


(c) Outline the steps involved in Robinson annulation**.** **(4+4+4)**

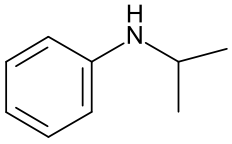
PART-C

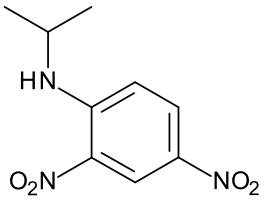
Answer any **TWO** questions **2x5=10M**

15. How do you bring about the following transformation? Do you encounter the problem of chemoselectivity during the reaction? Justify.

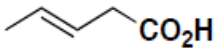


16. How would you synthesize compound (i)? How would your strategy to synthesize (ii) be influenced by the presence of two nitro groups in (ii)? Explain.

i) 

ii) 

17. Starting from an organic compound containing not more than four carbon atoms and any other inorganic reagent/reactant, write a possible synthetic route to the given compound below. Justify your choice of synthetic route.



……..End of questions……